

IN THE CLAIMS:

Please CANCEL claims 1-7 without prejudice to or disclaimer of their subject matter.

Please AMEND claims 8-11 and ADD claims 14 and 15, as follows:

1-7. (Cancelled)

8. (Currently Amended) A design support system which supports a user to design a convey path constituted by mechanical components by simulating a behavior of a flexible medium conveyed in the convey path, comprising:

a flexible medium model creating apparatus which creates a flexible medium model expressing a flexible medium, which is conveyed in a convey path as a design target in which an arrangement of mechanical components of the convey path is defined in advance, by using a plurality of stiff body elements each having a mass and one pair of rotational and translational springs which connect each adjacent pair of stiff body elements and have spring constants that change depending on a direction of flexural deformation of the flexible medium;

an input apparatus which inputs a convey condition in the convey path and frictional coefficients between the mechanical components arranged in the convey path and the flexible medium;

a motion calculation apparatus which time-serially calculates a behavioral state of the flexible medium in the convey path by numerical simulation on the basis of the flexible medium model and the input convey condition and frictional coefficients; and

a result display apparatus which displays the behavioral state of the flexible medium which is calculated by said motion calculation means,

wherein if a bending moment of each of the stiff body elements which is calculated by said motion calculation apparatus by numerical simulation is analyzed, and it is determined that a rotation moment larger than a predetermined value has locally occurred in the flexible medium, said flexible medium model creating apparatus increases a segmentation count that has been set in segmenting the flexible medium into a plurality of stiff body elements. The system according to claim 7,

wherein when coordinate values of two points of end portions of the flexible medium and a segmentation count between the two points are defined, said flexible medium model creating apparatus segments the flexible medium into a plurality of stiff body elements arranged at equal intervals between the two points.

9. (Currently Amended) A design support system which supports a user to design a convey path constituted by mechanical components by simulating a behavior of a flexible medium conveyed in the convey path, comprising:

a flexible medium model creating apparatus which creates a flexible medium model expressing a flexible medium, which is conveyed in a convey path as a design target in which an arrangement of mechanical components of the convey path is defined in advance, by using a plurality of stiff body elements each having a mass and one pair of rotational and translational springs which connect each adjacent pair of stiff body elements and have spring constants that change depending on a direction of flexural deformation of the flexible medium;

an input apparatus which inputs a convey condition in the convey path and frictional coefficients between the mechanical components arranged in the convey path and the flexible medium;

a motion calculation apparatus which time-serially calculates a behavioral state of the flexible medium in the convey path by numerical simulation on the basis of the flexible medium model and the input convey condition and frictional coefficients; and

a result display apparatus which displays the behavioral state of the flexible medium which is calculated by said motion calculation means.

wherein if a bending moment of each of the stiff body elements which is calculated by said motion calculation apparatus by numerical simulation is analyzed, and it is determined that a rotation moment larger than a predetermined value has locally occurred in the flexible medium, said flexible medium model creating apparatus increases a segmentation count that has been set in segmenting the flexible medium into a plurality of stiff body elements, The system according to claim 7;

wherein when coordinate values of two points of end portions of the flexible medium and a segmentation count between the two points are defined, said flexible medium model creating apparatus segments the flexible medium into a plurality of stiff body elements arranged at an equal ratio between the two points.

10. (Currently Amended) A design support system which supports a user to design a convey path constituted by mechanical components by simulating a behavior of a flexible medium conveyed in the convey path, comprising:

a flexible medium model creating apparatus which creates a flexible medium model expressing a flexible medium, which is conveyed in a convey path as a design target in which an arrangement of mechanical components of the convey path is defined in advance, by using a plurality of stiff body elements each having a mass and one pair of rotational and translational springs which connect each adjacent pair of stiff body elements and have spring constants that change depending on a direction of flexural deformation of the flexible medium;

an input apparatus which inputs a convey condition in the convey path and frictional coefficients between the mechanical components arranged in the convey path and the flexible medium;

a motion calculation apparatus which time-serially calculates a behavioral state of the flexible medium in the convey path by numerical simulation on the basis of the flexible medium model and the input convey condition and frictional coefficients; and

a result display apparatus which displays the behavioral state of the flexible medium which is calculated by said motion calculation means,

wherein if a bending moment of each of the stiff body elements which is calculated by said motion calculation apparatus by numerical simulation is analyzed, and it is determined that a rotation moment larger than a predetermined value has locally occurred in the flexible medium, said flexible medium model creating apparatus increases a segmentation count that has been set in segmenting the flexible medium into a plurality of stiff body elements. The system according to claim 7;

wherein information about a segmentation form in segmenting a flexible medium to be conveyed through the convey path into a plurality of stiff boy elements is prestored

in a database in correspondence with each type of problem contents to be selected by a user with respect to the flexible medium, and said flexible medium model creating apparatus obtains information about a segmentation form corresponding to the type of problem contents selected by the user from the database, and segments the flexible medium into the plurality of stiff body elements on the basis of the information.

11. (Currently Amended) A design support method of supporting a user to design a convey path constituted by mechanical components by simulating a behavior of a flexible medium conveyed in the convey path, comprising:

a flexible medium model creating step of creating a flexible medium model expressing a flexible medium, which is conveyed in a convey path as a design target in which an arrangement of mechanical components of the convey path is defined in advance, by using a plurality of stiff body elements each having a mass and one pair of rotational and translational springs which connect each adjacent pair of stiff body elements and have spring constants that change depending on a direction of flexural deformation of the flexible medium;

an input step of inputting a convey condition in the convey path and frictional coefficients between the mechanical components arranged in the convey path and the flexible medium;

a motion calculation step of time-serially calculating a behavioral state of the flexible medium in the convey path by numerical simulation on the basis of the flexible medium model and the input convey condition and frictional coefficients; and

a result display step of displaying the behavioral state of the flexible medium

which is calculated in the motion calculation step, and

wherein information about a segmentation form in segmenting a flexible medium to be conveyed through the convey path into a plurality of stiff body elements is prestored in a database in correspondence with each type of problem contents to be selected by a user with respect to the flexible medium, and information about a segmentation form corresponding to the type of problem contents selected by the user from the database is obtained at the flexible medium model creating step, and the flexible medium is segmented into the plurality of stiff body elements on the basis of the information.

a re-segmentation step of, if a bending moment of each of the stiff body elements which is calculated in the motion calculation step by numerical simulation is analyzed; and it is determined that a rotation moment larger than a predetermined value has locally occurred in the flexible medium, increasing a segmentation count that has been set in segmenting the flexible medium into a plurality of stiff body elements;

12. (Original) A program for causing a computer to realize a design support method defined in claim 11.

13. (Original) A storage medium storing a program for causing a computer to realize a design support method defined in claim 11.

14. (New) A design support method of supporting a user to design a convey path constituted by mechanical components by simulating a behavior of a flexible medium

conveyed in the convey path, comprising:

a flexible medium model creating step of creating a flexible medium model expressing a flexible medium, which is conveyed in a convey path as a design target in which an arrangement of mechanical components of the convey path is defined in advance, by using a plurality of stiff body elements each having a mass and one pair of rotational and translational springs which connect each adjacent pair of stiff body elements and have spring constants that change depending on a direction of flexural deformation of the flexible medium;

an input step of inputting a convey condition in the convey path and frictional coefficients between the mechanical components arranged in the convey path and the flexible medium;

a motion calculation step of time-serially calculating a behavioral state of the flexible medium in the convey path by numerical simulation on the basis of the flexible medium model and the input convey condition and frictional coefficients; and

a result display step of displaying the behavioral state of the flexible medium which is calculated in the motion calculation step;

wherein when coordinate values of two points of end portions of the flexible medium and a segmentation count between the two points are defined, the flexible medium is segmented into a plurality of stiff body elements arranged at equal intervals between the two points at said flexible medium model creating step.

15. (New) A design support method of supporting a user to design a convey path constituted by mechanical components by simulating a behavior of a flexible medium

conveyed in the convey path, comprising:

a flexible medium model creating step of creating a flexible medium model expressing a flexible medium, which is conveyed in a convey path as a design target in which an arrangement of mechanical components of the convey path is defined in advance, by using a plurality of stiff body elements each having a mass and one pair of rotational and translational springs which connect each adjacent pair of stiff body elements and have spring constants that change depending on a direction of flexural deformation of the flexible medium;

an input step of inputting a convey condition in the convey path and frictional coefficients between the mechanical components arranged in the convey path and the flexible medium;

a motion calculation step of time-serially calculating a behavioral state of the flexible medium in the convey path by numerical simulation on the basis of the flexible medium model and the input convey condition and frictional coefficients; and

a result display step of displaying the behavioral state of the flexible medium which is calculated in the motion calculation step;

wherein when coordinate values of two points of end portions of the flexible medium and a segmentation count between the two points are defined, the flexible medium is segmented into a plurality of stiff body elements arranged at an equal ratio between the two points at the said flexible medium model creating step.